

## **TEXT OF PRESENTATION ON TRAIL CONSTRUCTION**

MORRIS COUNTY GREEN TABLE

(Morris County, New Jersey)

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by

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I'll be discussing issues and elements important to individual trail layout, construction and use.

On the back table is my contact information if you'd like a complete list of reference materials with sources - I'll be happy to send or Email the information. A copy of my notes from this talk will also be available.

For starters I'd like to condense the types of trails to two basic types  
Recreational Trails  
Community Trails.

Recreational trails will generally be constructed for and used by equestrians, mountain bikers, hikers, walkers, and cross country runners. Natural surface trails are frequently suitable for this group.

Community trails on the other hand, will generally be used by a wider range of users including the above plus families out for a stroll, parents pushing baby carriages, families taking a trip to local shops, bike commuters and are frequently accessible for people in wheel chairs. Groomed trails (generally not natural surface) are more suitable for this group.

Decisions to be made before construction:

- Should the trail include interpretive signs to showcase natural or cultural heritage...are there partnerships available to implement this?
- Seasonal or regular maintenance needs (snow, leaf and trash removal)
- Lighting?
- Should the trail interconnect with other trails or on-road facilities nearby?

County trails include:

Morris County Park Commission

- Patriots' Path (a part of the Liberty Water Gap Trail)
- West Morris Greenway
- Waughaw Mountain Trail

New Jersey Conservation Foundation

- Garden State Greenways: Proposed Routes

Canal Society of New Jersey

- Morris Canal Greenway

New York New Jersey Trail Conference:

- Highlands Trail
- Four Birds Trail

- Beaver Brook Trail
- Refer also to the NJ State Trails Plan.

ALSO:

- Meet with your neighboring communities and form new regional trail systems if appropriate
- The trail design must be suitable for the intended users. Have you asked all the user groups to comment on the location, the trail layout and it's utility and attractiveness to them? (Don't assume anything)
- Parking facilities as appropriate (motor vehicles and bicycle)
- Coordinate parking lot entrances and exits with your highway authorities
- Will toilet facilities be needed?
- Have a trail name marker at all road crossings visible from the road - (a slick way of publicizing the trail). Be sure such signs are permitted....

Consider Safety Issues:

- Infrastructure and trail should be appropriate for emergency access
- Emergency phone numbers should be posted in directories
- Name of the trail and exact location (including town name)
- Name and phone for manager/maintenance
- At all road crossings, place a sign that includes the road name, emergency phone numbers, the exact location of the marker and any other information which could direct EMS crews to that spot

NOTICES for the directory:

- Rules/restrictions
- Seasonal uses permitted (skiing, etc.)

New Jersey Department of Environmental Protection issues include:

Find out if permits will be required.

- Soil Erosion & Sedimentation
- Storm Water
- Stream Encroachment
- Wetlands
- (Do NOT be casual about the NJDEP's interest)
- And of course now, the Highlands Act

After the initial planning, I'd like to now start with a hypothetical trail which has been proposed for an area, and received a general approval from the stakeholders.

I recommend that you start the "on the ground" design proposal with a relatively small group - folks who are aware of the features which have been mentioned during the general planning process. "Too many cooks ...".

Start with a decent sized, appropriately detailed map of the area, with all of the following features located and identified: Proposed access points (note any with parking possibilities), locations to be featured - schools, library, neighborhoods, shops, train stations, bus stops, natural areas - both of attraction and to avoid as sensitive, any areas prone to high water, poor drainage, steep slopes, dangerous areas, "safe" street crossings, water features including streams, ponds, fishing access points, nesting areas for water birds. Of necessity in a suburban environment, some of your trail may need to be routed on sidewalks or streets.

Note please that the above list sure can't be complete for your situation - many of the features won't be useful for a Community Trail - and others won't be suitable for a Recreational Trail.

At this point, we suggest that you characterize the trail according to the standards in the State Trails Plan, and make certain that the trail will be consistent with the property owners wishes, the Master Plan for the community, deed or easement restrictions.

After reaching a consensus (of sorts) start planning the route "on the ground" by walking it with your group. Remember to include discussions about all of the concerns which have been mentioned.

Then if appropriate, present the plan to your public and ask for comments.

Remember "Keep your friends close but keep **all others** - *closer*".

For the "on the ground" construction planning, get some temporary trail markers - for a wooded area use surveyor's tape and for open areas use "pin flags" - used to mark-out underground water pipes.

As you start marking the route, just be aware that low-lying spots may drain poorly.

Avoid "fall-line" routes which go directly down a steep slope (erosion is the concern here). Consider having the trail descend across the slope instead of straight down. Switch backs may be needed. (Refer to the IMBA Trail Solutions book)

Avoid gullies - where water may flow with some force, or consider the need for a raised section of trail.

Be aware that routing a trail along a waterway for any distance will likely impact wildlife / nesting.

Avoid routing the trail close to shallow rooted trees (Beach trees) as the roots will either be impacted or for a natural surface trail, they will "surface" and are very, very difficult to walk or ride over.

Avoid locating the trail closely on the down-slope side of a tree - the up-slope location has less impact on roots.

When intersecting with another trail, be aware of the need for sight-lines. As appropriate, you may also want to consider controlling bike speed (See IMBA Trail Solutions).

### **For community trails:**

We have used the construction technique where you would dig a wide, shallow channel about 3-4" deep and 6 ft wide for the trail, then fill it with Stone Dust", and then leveling and compacting the trail surface with a mechanical vibrating compactor. Do NOT skimp on this step, compact it right from the get-go.

Make sure that the bottom of this channel is flat.

Avoid tight turns if bicycles will be permitted on crushed stone trails.

If using geosynthetic fabrics under the crushed stone, have a good supply of 6” staples to hold the fabric in place.

If the trail will be routed on a grassy area, consider renting a sod cutter and recycling the sod.

Finally and again, for the crushed stone trail, compact it well.

### **For natural surface trails:**

Be very aware of IMBA’s recommended construction suggestions - even if for foot traffic only. The suggestions simply work. It’s just that simple. Follow their suggestions.

The natural surface trails which we have constructed have needed a revisit about a year after we constructed them. We call this “buffing and polishing”, and it’s purpose is to re-groom the trail’s profile, remove any berm which has formed and just plain correct any mistakes made in the initial construction.

### **Mapping Issues**

- Where possible, provide a pocket-sized maps at the trailheads (be aware of the possibility of litter problems).
- How large a map? Folded to pocket size? Brochure size? Printed on paper? Tyvek?
- Include a (printable) copy of your map on your internet site
- Style issues: 2-color? 4-color? Include topographic lines? Include roads and other features? Look out for costs....
- How to distribute, how many to print? Map availability at trailheads, posted in the directory and map boxes
- Provide maps to trail users - maps in the directory have limited usefulness to someone on the trail
- What other information might be included on the map? Wildlife viewing sites? Fishing sites? Scenic overlooks? Historic sites? Area history?
- Provide for map revisions over time: such as for modifications and additions to the trail system, new amenities
- Include applicable rules and regulations as appropriate
- Include emergency contact phone numbers, names and phones for manager and maintenance organization
- Provide copies of the map to your emergency services such as Fire, Rescue and Police

### **After the Trail is Complete**

- Let your community know about it
- Let hiking and trail advocacy groups, seniors, health professionals, schools parents and business district know about it
- Provide for periodic inspection and maintenance of infrastructure as needed. This is especially important for the first several years after constructing a natural surface trail.
- Light maintenance: by volunteers? Refer to the Park Commission’s Adopt-a-Trail program.

- For natural areas consider providing bird viewing lists
- Cut down on litter and costs by making trail maps available for printing from your web site
- Include a “suggestion box” on your web site

## **Trail Layout, Design and Construction Resources**

### **New Jersey Conservation Foundation**

Garden State Greenways

<http://www.gardenstategreenways.org/>

(Identifies potential trail hubs and connectors between them)

### **US Department of Agriculture**

Forest Service

All below are available at no cost from:

Missoula Technology & Development Center

406-329-3978

Trail Construction and Maintenance Handbook

(A pocket guide with many facts and techniques)

Wetland Trail Design and Construction

Hand Tools for Trail Work

Geosynthetics for Trails in Wet Areas

### **Natureshape LLC**

Natural Surface Trails by Design

[www.natureshape.com](http://www.natureshape.com)

(Natural surface trails: An excellent “philosophical AND practical” design guide but sadly, just the first of an incomplete series)

### **International Mountain Biking Association (IMBA)**

Trail Solutions

<http://www.imba.com/>

(An excellent, all-round guide to natural surface multi-use trails)

### **American Trails**

<http://www.americantrails.org/>

A comprehensive resource for **all** aspects of trails.

### **Appalachian Trail Conference**

Appalachian Trail Design, Construction and Maintenance

(Rustic hiking trail design and construction)

### **New Jersey State Trails Plan**

[www.njtrailsplan.org/pdfs/01\\_ExecutiveSummary.pdf](http://www.njtrailsplan.org/pdfs/01_ExecutiveSummary.pdf)

(Currently being revised, presently only the 1996 version is available)



## **Designing Sidewalks and Trails for Access**

### **Part 1: Review of Existing Guidelines and Practices**

<http://www.fhwa.dot.gov/environment/bikeped/access-1.htm>

### **Part 2: Best Practices Design Guide**

<http://www.fhwa.dot.gov/environment/sidewalk2/index.htm>

## **Morris County Park Commission**

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973-326-7604

## **Morris Land Conservancy**

(Morris Land Conservancy offers an excellent municipal trails planning and implementation service)

### Sample Trails Plans:

[www.roxburynj.us/DocumentView.asp?DID=451](http://www.roxburynj.us/DocumentView.asp?DID=451) (Roxbury's Trails Plan)

<http://www.morristwp.com/pdfs/trails1.pdf> (Draft of Morris Township's Plan)

[www.morrislandconservancy.org](http://www.morrislandconservancy.org)

Barbara Davis, Vice President, Programs

bhdavis@morrisland.org

973-541-1010

## **Morris Trails Partnership**

This document is available now (but you already know that)

[www.morristrails.org](http://www.morristrails.org)

973-829-8256

## **Reports:**

**Assessing and Understanding Trail Degradation ...** (Final report)

[www.imba.org.uk/uploads/papers/marion\\_nps\\_report.pdf](http://www.imba.org.uk/uploads/papers/marion_nps_report.pdf)

An excellent report which details and compares the impacts of various trail users. I do however, suggest you start on page 34.

## **Grants for Trails and Trail Amenities**

**NJ Recreational Trails Program Grants** (to \$25,000)  
[www.state.nj.us/dep/parksandforests/natural/njtrails.html](http://www.state.nj.us/dep/parksandforests/natural/njtrails.html)

**Safe Routes to School** (Grants)  
<http://www.state.nj.us/transportation/community/srts/>

**Transoptions** (Trail and/or transportation grants under \$8,000)  
*Note: Deadline for 2008 is May 28th.*  
[www.transoptions.org](http://www.transoptions.org)  
973-267-7600

**Transportation Equity Act 21st Century** (Federal grants dispensed by NJDoT)  
<http://www.state.nj.us/transportation/business/localaid/forms.shtm>

## **Materials and equipment resources**

**Equipment Rentals**  
Grey Supply 973-366-7272  
All County Rental 973-267-1255

**Geosynthetic Fabric (Landscape Cloth)**  
West Chester Machinery & Supply 973-347-1101  
Thompson Materials

**Crushed Stone**  
Tilcon (Various facilities around the state)  
Local quarries

Below is the scan of a memo from a consultant concerning a crushed stone mix specificat

The Park Commission was able to get a tandem load for about \$25/ton in 2006 from Tilco and so far, it looks very good (5/08).

## Specifications for Accessible Trail Surfacing

Crushed Schist from John S. Lane & Son, Inc. - West Stockbridge Quarry, Massachusetts

The following specifications are for a ½ inch minus crushed schist which compacts very well and has been used on several accessible trails in Berkshire County. These specs can be applied to other rock types and samples should be compacted and tested for firmness and stability before use on other accessible trails.

From experience, the key to success of this type of crushed rock material is the gradation of particle sizes and the percentage of fines. The angular nature of the crushed rock is also key to locking the material together.

The following information was gathered on November 29, 2005 and resulted in the following distribution of particle sizes:

<u>Sieve Size</u>	<u>% Passing</u>	<u>Acceptable Percentage range</u>
½"	99.5	95 - 100
3/8"	89.0	85 - 95
1/4"	70.2	60 - 75
#4	61.7	35 - 65
#8	44.8	
#10	41.7	
#16	33.6	20 - 40
#30	26.5	
#40	23.8	
#50	21.6	15 - 30
#60	20.6	
#100	17.6	
#200	13.3	10 - 15

The Acceptable Percentage Range provides potential suppliers with some flexibility in providing a viable ½ inch minus stone product.

Questions regarding the use of this type of product or the sieve analysis, please contact Peter Jensen, Trail Designer/Builder - Peter S. Jensen & Associates, LLC, P.O. Box 316, Great Barrington, MA. 413-441-0204